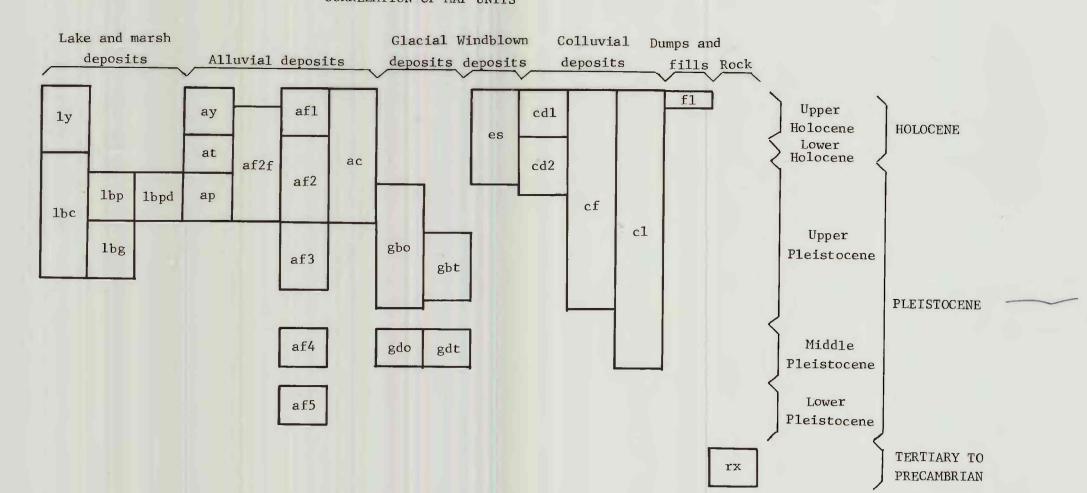
Limit of mapping

STATE PRISON

Base from U.S. Geological Survey

111°52'30"

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

LAKE AND MARSH DEPOSITS

LAKE AND MARSH DEPOSITS OF HOT SPRING LAKE (HOLOCENE) -- Silt and clay. Deposited in former lake and marshes, now drained, that existed in low-lying area west of Warm Springs fault. Subject to high water table and flooding

DEPOSITS OF THE BONNEVILLE LAKE CYCLE(UPPER PLEISTOCENE) -- The deposits of the Bonneville lake cycle are divided into three units on the basis of grain size and age. All of the dominantly finegrained sediments, mostly fine sand, silt, and clay, are mapped as unit lbc, regardless of when in the lake cycle they were deposited. The deposits of gravel and sand are subdivided according to whether they were deposited before or after the lake level fell from the Bonneville shoreline to the Provo shoreline. Gravel and sand deposited as the lake level was rising to and standing at the Bonneville shoreline are mapped as unit 1bg. Gravel and sand deposited after the lake level fell rapidly from the Bonneville shoreline to the Provo shoreline, and during the more protracted fall below the Provo shoreline, are mapped as units lbp and lbpd. West of City Creek, it is difficult to subdivide the gravel and sand units that lie at altitudes below the Provo shoreline because the recessional deposits are thin and discontinuous and overlie lithologically similar sediments that were deposited in the transgressive phase of the Bonneville lake cycle and during older lake cycles. Therefore, all the deposite of gravel and sand that lie below the Provo shoreline in the area west of City Creek are mapped as 1bg. Because interbedding of sediments of contrasting grain size is common in lacustrine deposits, individual map units may contain beds of both fine- (silt and clay) and doarse- (gravel and sand) grained sediments; the map unit selected reflects the dominant grain size.

edt Little Cottonwood

Canyon

Bells Canyon

Clay, silt, and sand-Clay, silt, and fine sand; good sorting of individual beds; parallel bedding, minor crossbedding, very thin laminae (<1 mm) to thick beds (30-100 cm), bedding locally disrupted. Locally contains minor medium to coarse sand and fine gravel. Deposited in deep water on lake floor and in lagoons and other protected areas behind spits and bars; locally includes sediments deposited as topset alluvium on deltas. Thickness I to more than 20 m

Gravel and sand of Provo and recessional shorelines -- Pebble and cobble gravel with minor sand, pebbly sand, and sand; good softing of individual beds; gravel subround to round; horizontal to inclined parallel bedding, crossbedding, thin (1-10 cm) to thick (30-100 cm) beds. Locally includes beds and lenses of silt and sandy silt. Deposited on beaches, bars, and spits.

Gravel and sand of deltas of Provo and recessional shorelines-Petble and cobble gravel with minor sand, pebbly sand, and sand; good sorting of individual beds; gravel round to subround; Indlined parallel bedding with dips of 5-30° and crossbedding, thin (1-10 cm) to thick (30-100 cm) beds. Locally includes beds and lenses of silt and sandy silt. Forms foreset beds and some topset beds of deltas; most topset beds included in unit ap. Thickness 1-25 m

Thickness 1-25 m

Gravel and sand of transgressive and Bonneville shorelines-Pebble and cobble gravel with minor sand, pebbly sand, and sand; good souting of individual beds; gravel clasts subround to cound; hodizontal to inclined parallel bedding and crossbedding, thin (1-10 cm) to thick (30-100 cm) beds. Base may be bouldery. Includes minor interbeds and lenses of silt and clay, as well as local interbedded silt and clay units as thick as 10 m that were deposited in lagoons. Deposited on beaches, bars, spits, and deltas during tise to and stand at the Bonneville shoreline. Thickness 1-25 m

ALLUVIAL DEPOSITS Atlavial deposits are divided mainly according to type and age, which is etermined by (|) their stratigraphic and geomorphic relationships to deposits of the Bonneville lake cycle and to glacial deposits of the Bells Canyon advance and (2) by their degree of soil development (Fig. 2).

FLOOD-PLAIN ALLUVIUM (UPPER HOLOCENE) -- Sand, silt, clay, and locally gravel along Jordan River and lower reaches of its tributaries; mostly pebble and cobble gravel, sand, and silt along upper reaches of streams that head in Wasatch Range; poor to moderate sorting; parallel bedding and crossbedding. Subject to flooding and high water table. Exposed thickness 1-3 m

FAN ALHUVIUM (HOLOCENE AND PLEISTOCFNE) -- Clast-supported cobble and pebble gravel, locally bouldery, with matrix of sand to silty sand; poor sorting; gravel clasts subangular to round; parallel bedding and grossbedding, locally massive bedding; thin (1-10 cm) to thick (30-100 cm) beds. Deposited by streams and debris flows. Thickness I to more than 10 m

Fan alluvium 1 (Upper Molocene) -- Soils formed in these deposits tack a B horizon or have a cambic B horizon (Fig. 2); all are thought to reflect less than 6000 yr of soil development. Includes small areas of unit af2. Many deposits too small to show at this scale are included in unit af2

Fau alluvium 2 (Lower Holocene and Upper Pleistocene) -- Deposited late in the Bonneville lake cycle and in early Holocene time. Soils formed in these deposits have Bt horizons and are estimated to be 6-15 ka (Fig. 2). Includes small areas of unit afl especially near fan heads and along channels

Fan alluvium 3 (Upper Pleistocene) -- Forms fans that are graded to transgressive shorelines of Bonneville take cycle and Bonneville shoreline. Soils formed in these deposits are similar to 13-ka soils (Fig. 2), but typically have thicker Bt horizons

Fan alluvium 4 (Middle Pleistocene) Forms fans older than Bonneville lake cycle. Most soils formed in these deposits have thick, clayey Bt horizons similar to the > 150-ka soils (Fig. 2)

Fan alluvium 5 (Lower? Pleistocene) -- Forms isolated remnants on ridge tops near front of Wasatch Range. Some may be old till rather than alluvium

ALLUVIUM AND COLLUVIUM DERIVED FROM UNCONSOLIDATED DEPOSITS (HOLOCENE AND UPPER PLEISTOCENE) -- Gravel, sand, silt, and clay; grain size and clast roundness reflects character of source deposits upslope; generally poorly sorted; parallel bedding, crossbedding, and massive bedding. Forms small fans and apruns of debris at the base of slopes formed in unconsolidated deposits. Includes sediments in grabens along Wasatch fault. Deposited by streams and by mass-

ALLUVIUM OF LOW TERRACES (LOWER HOLOCENE AND UPPER PLEISTOCENE) --Mostly sand, silt and clay along Jordan River and lower reaches of its tributaries; mostly gravel and sand along upper reaches of streams that head in Wasatch Range; poor to moderate sorting. Deposited by streams graded to low recessional stands of Lake Bonneville and to low-level lakes of early Holocene age. Exposed thickness 1-5 m

wasting processes. Thickness I to more than 10 m

af2f FINE-GRAINED FAN ALLUVIUM 2 AND MIXED LAKE, MARSH, AND ALLUVIAL DEPOSITS (HOLOCENE AND UPPER PLEISTOCENE) -- Silt, clay, and sand, locally very minor pebble gravel, locally organic-rich. Deposited by streams in low-gradient areas on the distal parts of alluvial fans hear center of valley; also deposited in shallow lakes and marshes of low recessional stands during Bonneville lake cycle. Thickness I to more than 3 m

GRAVELLY ALLUVIUM OF TERRACES GRADED TO PROVO AND HIGH RECESSIONAL SHORE INES (UPPER PLEISTOCENE) -- Clast-supported cobble and pebble gravel, locally bouldery, with matrix of sand and silt; poor sorting; gravel clasts subangular to round; parallel bedding and crossbedding, locally massive bedding. Deposited by streams graded to Provo shoreline and higher recessional shorelines of Bonneville lake cycle. Also deposited as topset alluvium on deltas of unit lbpd. Soils formed in these deposits have Bt horizons and are thought to be 11-15 ka (Fig. 2). In glaciated drafnages, unit ap merges upstress with unit who. Thickness 1-10 m

GLACIAL DEPOSITS

The glacial deposits are subdivided based on their age and whether they were deposited by glacier ice (till) or by glacier meltwater streams (outwash). The nomenclature and dating of glacial deposits follows the work of McCoy (1977) and Madsen and Currey (1979). Deposits of Bells Canyon age are broadly equivalent in age to Pinedale deposits mapped widely in the Rocky Mountains. They pre-date, by a few thousand years, the initial occupation of the Bonneville shoreline, which occurred about 16 ka. Deposits of Dry Creek age have weathering characteristics similar to deposits of Bull Lake age in the Rocky Mountains that are thought to be about 150 ka (Pierce and others, 1976). A deposit of fan alluvium 4 near South Fork Dry Creek, which based on its lithology and soil-morphologic characteristics may be outwash of Dry Creek age, has a uranium-trend age of 250 ± 90 ka (J. N. Rosholt, written commun, 1984). Therefore, deposits of Dry Creek age are probably at least 150 ka and some may be even older.

OUTWASH OF BELLS CANYON AGE (UPPER PLEISTOCENE) -- Clast-supported cobble and pebble gravel, locally bouldery, with minor matrix of sand and silt; poor to moderate sorting; gravel clasts subangular to round; parallel bedding and crossbedding; thin (1-10 cm) to thick (30-100 cm) heds. Below Big and Little Cottonwood Canvons and Bells Canyon grades into unit ap. Exposed thickness 1-40 m

TILL OF BELLS CANYON AGE (UPPER PLEISTOCENE) -- Matrix-supported boulder to pebble gravel in sandy silt to silty sand matrix; very poor sorting; gravel clasts subangular to subround; nonbedded. Forms massive moraines at the mouths of Little Cottonwood and Bells Canyons. Exposed thickness 1-10 m

OUTWASH OF DRY CREEK AGE (MIDDLE PLEISTOCENE) -- Clast-supported cobble and pebble gravel, locally bouldery, with minor matrix of sand and silt; poor to moderate sorting; gravel clasts subangular to round; parallel bedding and crossbedding; thin (1-10 cm) to thick (30-100 cm) beds. Exposed in small areas in gravel pit north of mouth of Big Cottonwood Canyon and along Dry Creek. Soil formed in unit is similar to the > 150-ka soil in Figure 2. Exposed thickness 1-15 m

TILL OF DRY CREEK AGE (MIDDLE PLEISTOCENE) -- Matrix-supported boulder to pebble gravel in sandy silt to silty sand matrix; very poor sorting; gravel clasts subangular to subround; nonbedded. Surface of till contains much grus derived from weathering of quartz monzonite boulders; soil formed in till is similar to > 150-ka soil in Figure 2. Exposed thickness 1-8 m

WINDBLOWN DEPOSITS Eolian sand Is the only windblown deposit shown on the map; however, thin (< 1 m), discontinuous deposits of loess, a silt-rich windblown sediment, cover most of the other surficial deposits in the map area that are early Holocene or older (Shroba, 1984). The loess is weathered and mixed with the upper parts of the underlying deposits; it occurs in the upper part of the

EOLIAN SAND (HOLOCENE AND UPPER PLEISTOCENE) -- Fine to coarse sand, minor silty sand; moderate to good sorting; crossbedding and massive bedding; thin (1-10 cm) to medium (10-30 cm) beds. Forms sheets of sand and low parabolic and longitudinal dunes. Largely reworked from sandy deposits of Bonneville lake cycle. Soils developed in eolism sand lack B horizons or have camble or argillic B horizons, depending on age and grainsize. Thickness 1-3 m

COLLUVIAL DEPOSITS DEBRIS-FLOW DEPOSITS I (UPPER HOLOCENE) -- Clast-supported boulder to pebble gravel with matrix of sand, silt, and clay, boulders as large as several meters in diameter are common; gravel-sized clasts angular to subround; very poor sorting; massive bedding. Deposited by rapidly moving flows of rock debris, sand, mud, and water. Forms fau- to lobate-shaped deposits at mouths of several canyons south of Rig Cottonwood Canyon. Soils developed in these deposits are similar to 2-4-ka soils in Figure 2. Thickness 1 to >5 m

COLLUVIUM DERIVED FROM BEDROCK (HOLOCENE AND UPPER PLEISTOCENE) ---Pebble to boulder-sized rubble with minor matrix of sand and silt; gravel-sized clasts angular to subangular; very poor sorting; massive bedding to crude parallel bedding. Forms small fans, comes, and appears of debris at the mouths of small canyons and at the bases of bedrock slopes. Deposited by mass-wasting processes,

sheetwash, and debris flows. Thickness I to more than 10 m LANDSLIDE DEPOSITS (HOLOCENE TO MIDDLE PLEISTOCENE) -- Grain size reflects texture of materials in source area of landslide. Nonsorted and nonbedded. Typically deposited by slumps and earthflows on steep slopes and by lateral-spreading, ground fallures on gentle slopes

DEERIS-FLOW DEPOSITS 2 (LOWER HOLOCENE AND UPPER PLEISTOCENE) -- Clastsupported boulder to pebble gravel, with matrix of sand and silt, boulders as large as several meters are common; very poor sorting; gravel-sized clasts angular to subround; massive bedding to crude parallel bedding. Deposited by rapidly moving flows of rock debris, sand, mud, and water. Forms fan- or lobate- thaned deposits at mouth of several canyons south of Bells Canyon; some deposits are hummocky. Soils developed in these deposits are similar to the 13-ka soil in Figure 2. Thickness 1 to >5 m

FILLS AND DUMPS ARTIFICIAL FILL (HISTORIC) -- Fills of assorted materials; includes landfills, tailings, and engineered fills for highways, railways, and buildings

REDROCK, UNDIVIDED (TERTIARY TO PRECAMBRIAN) -- Rock; in many places covered by thin deposits of colluvium, which are not mapped separately; includes small areas of units of and gbt. The size of some areas of bedrock close to fault scarps is exaggerated in order for them to be shown at map scale

> This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.

MAP SYMBOLS

where it is concealed. Bar and ball on downthrown side

Faults in Quaternary deposits; solid where it forms scarp in mapped

Alluvial-terrace scarps within a single map unit; hachures point down

Scarp height and net vertical displacement in meters across a fault

Petersen (1981), d, Rebecca Todge (written commun., 1981); no letter,

scarp of zone of fault scarps; dash, no data. Source of data: p,

unit; dashed where it is approximately located or inferred; dotted

Contact; dashed where gradational

localities referred to in text

Lines study

SCALE 1:24,000

CONTOUR INTERVAL 20 AND 40 FEET DOTTED LINES REPRESENT 5- AND 10-FOOT CONTOURS

Geology mapped in 1979-1981 by

W. E. Scott and compiled from published maps as described in